

LISTING OF CLAIMS

1. (previously presented) A method for modulating sub-carrier symbols $F(k)$ to an intermediate-frequency OFDM signal $(f(n))$ having even and odd samples, the method comprising the steps of:
 - transforming a number N of the sub-carrier symbols $F(k)$ to pre-processed sub-carrier symbols $Z(k)$ according to the function:
$$Z(k) = \frac{1}{2} \cdot [F(k) + F(N-k)^*] + \frac{1}{2} \cdot j \cdot [F(k) - F(N-k)^*] \cdot e^{+j\pi k/N}$$
with $k=0 \dots N-1$;
 - performing a complex inverse discrete Fourier transformation (IDFT) on the pre-processed sub-carrier symbols $Z(k)$ to generate complex output symbols $z(n)$; and
 - transforming the complex output symbols $z(n)$ to the intermediate-frequency OFDM signal $(f(n))$, by multiplexing the real and imaginary parts of the complex output symbols $z(n)$ into even and odd samples of the intermediate frequency OFDM signal $(f(n))$.
2. (previously presented) Method according to claim 1 further comprising the steps of:
 - assigning the sub-carrier symbols $F(k)$ to a spectrum $F(i)$ with $i=0 \dots 2N-1$ of the intermediate-frequency OFDM signal $(f(n))$, negative frequency contents being derivable from the symmetry property of spectra of real sequences, $F(i) = F(2N-i)^*$;
 - converting the sub-carrier symbols $F(k)$, with $k=0 \dots N-1$, to the pre-processed complex sub-carrier symbols

$Z(k)$ using the symmetry property of spectra of real sequences, wherein $Z(k)=X(k)+j*Y(k)$ with $X(k)$ and $Y(k)$ defining the spectra of real sequences $x(n)$ and $y(n)$; and

- performing the complex inverse discrete Fourier transformation (IDFT) of the pre-processed complex sub-carrier symbols $Z(k)$ into the complex output symbols $z(n) = x(n)+j*y(n)$.

3. (currently amended) Method according to ~~any preceding~~ claim 1, wherein the complex inverse discrete Fourier transformation (IDFT) is performed as an inverse fast Fourier transformation (IFFT).
4. (previously presented) A method for demodulating an intermediate-frequency OFDM signal ($f(n)$) having even and odd samples to post-processed sub-carrier symbols $F(k)$, the method comprising the steps of:
 - transforming the intermediate-frequency OFDM signal ($f(n)$) to complex input symbols $z(n)$, by demultiplexing the even and odd samples of the intermediate-frequency OFDM signal ($f(n)$) onto the real and imaginary parts of the complex input symbols $z(n)=x(n)+j*y(n)$ with $x(n)=f(2n)$ and $y(n)=f(2n+1)$ with $n=0...N-1$;
 - performing a complex discrete Fourier transformation (DFT) on the complex input symbols $z(n)$ to generate complex DFT output symbols $Z(k)$; and
 - transforming the complex DFT output symbols $Z(k)$ to the post-processed sub-carrier symbols $F(k)$ according to the function:

$$F(k) = \frac{1}{2} \cdot [Z(k) + Z(N-k)^*] - \frac{1}{2} \cdot j \cdot [Z(k) - Z(N-k)^*] \cdot e^{-j\pi k/N}$$

with $k=0 \dots N-1$.

5. (previously presented) Method according to claim 4, wherein the complex discrete Fourier transformation (DFT) is performed as a fast Fourier transformation (FFT).
6. (currently amended) Method according to claim 4, ~~one of the claims 4 or 5~~ further comprising the steps of:
 - performing the complex discrete Fourier transformation (DFT) of the complex input symbols $z(n)$ into the complex DFT output symbols $Z(k) = X(k) + j \cdot Y(k)$ with $k=0 \dots N-1$, $X(k)$ and $Y(k)$ being the spectra of the real sequences $x(n)$ and $y(n)$;
 - post-processing of the complex DFT output symbols $Z(k)$ with $k=1 \dots N-1$ to the post-processed sub-carrier symbols $F(k) = X(k) + e^{-j\pi k/N} \cdot Y(k)$ of the intermediate-frequency OFDM signal ($f(n)$); and
 - assigning the post-processed sub-carrier symbols $F(k)$ to an order for further processing.
7. (currently amended) A computer program element comprising program code means for performing the method of claim 1 ~~of any one of the claims 1 to 7~~ when said program is run on a computer.
8. (currently amended) A computer program product stored on a computer usable medium, comprising computer readable program means for causing a computer to

perform the method according to claim 1 ~~any one of the~~
~~claims 1 to 7.~~

9. (currently amended) An orthogonal frequency division multiplex modulator (1) for modulating sub-carrier symbols $F(k)$ to an intermediate-frequency OFDM signal ($f(n)$) having even and odd samples, the modulator comprising:

- first transforming means ~~(10)~~ for transforming a number N of the sub-carrier symbols $F(k)$ to pre-processed sub-carrier symbols $Z(k)$, adapted to perform the according to the function:

$$Z(k) = \frac{1}{2} \cdot [F(k) + F(N-k)^*] + \frac{1}{2} \cdot j \cdot [F(k) - F(N-k)^*] \cdot e^{+j\pi k/N}$$

with $k=0 \dots N-1$;

- IDFT means ~~(4)~~ for performing a complex inverse discrete Fourier transformation (IDFT) on the pre-processed sub-carrier symbols $Z(k)$ to generate complex output symbols $z(n)$; and

- second transforming means ~~(50)~~ comprising a multiplexing means ~~(52)~~ for multiplexing of the real and imaginary parts of ~~for transforming the complex output symbols $z(n)$ into even and odd samples of~~ ~~to~~ the intermediate-frequency OFDM signal ($f(n)$).

10. (currently amended) Orthogonal frequency division multiplex modulator ~~(1)~~ according to claim 9, wherein the IDFT means ~~(4)~~ exhibits the functionality to perform an inverse fast Fourier transformation (IFFT).

11. (currently amended) Orthogonal frequency division multiplex modulator ~~(1)~~ according to claim 9 ~~one of the claims 9 or 10~~, wherein the first transforming means ~~(10)~~ further comprises:
- assigning means ~~(10a)~~ for assigning the sub-carrier symbols $F(k)$ to a spectrum $F(i)$ with $i=0..2N-1$ of the intermediate-frequency OFDM signal ($f(n)$), negative frequency contents being derivable from the symmetry property of spectra of real sequences, $F(i)=F(2N-i)^*$;
 - converter means ~~(10b)~~ for converting the sub-carrier symbols $F(k)$, with $k=0..N-1$, to the pre-processed complex sub-carrier symbols $Z(k)$ using the symmetry property of spectra of real sequences, where $Z(k)=X(k)+j*Y(k)$ with $X(k)$ and $Y(k)$ defining the spectra of real sequences $x(n)$ and $y(n)$.
12. (currently amended) Orthogonal frequency division multiplex modulator ~~(1)~~ according to claim 9 ~~one of the claims 9 to 11~~, wherein the IDFT means ~~(4)~~ is adapted to perform the complex inverse discrete Fourier transformation (IDFT) of the pre-processed complex sub-carrier symbols $Z(k)$ into the complex output symbols $z(n) = x(n)+j*y(n)$.
13. (currently amended) Orthogonal frequency division multiplex modulator ~~(1)~~ according to claim 9 ~~one of the claims 9 to 12~~, wherein the first transforming means ~~(10)~~ and the IDFT means ~~(4)~~ are integrated into one device.
14. (currently amended) An orthogonal frequency division multiplex demodulator ~~(2)~~ for demodulating an

intermediate-frequency OFDM signal ($f(n)$) having even and odd samples to post-processed sub-carrier symbols $F(k)$, the demodulator comprising:

- third transforming means ~~(13)~~ comprising de-multiplexer means ~~(13a)~~ for de-multiplexing the even and odd samples of the intermediate-frequency OFDM signal ($f(n)$) onto the real and imaginary parts of the complex DFT input symbols $z(n)=x(n)+j*y(n)$ with $x(n)=f(2n)$ and $y(n)=f(2n+1)$, with $n=0...N-1$;
- DFT means ~~(14)~~ for performing a complex discrete Fourier transformation on the complex input symbols $z(n)$ to generate complex DFT output symbols $Z(k)$;
- fourth transforming means ~~(15)~~ for transforming the complex DFT output symbols $Z(k)$ to the post-processed sub-carrier symbols $F(k)$, adapted to perform the function:

$$F(k) = \frac{1}{2} \cdot [Z(k) + Z(N-k)^*] - \frac{1}{2} \cdot j \cdot [Z(k) - Z(N-k)^*] \cdot e^{-j\pi k/N}$$

with $k=0...N-1$.

15. (currently amended) Orthogonal frequency division multiplex demodulator ~~(2)~~ according to claim 14, wherein the DFT means ~~(14)~~ exhibits the functionality to perform a fast Fourier transformation (FFT).
16. (currently amended) Orthogonal frequency division multiplex demodulator ~~(2)~~ according to claim 14 ~~one of the claims 14 or 15~~, wherein the DFT means ~~(14)~~ is adapted to perform the complex discrete Fourier transformation (DFT) of the complex input symbols $z(n)$ into complex DFT output symbols $Z(k)=X(k)+j*Y(k)$, with

$k=0\dots N-1$, where $X(k)$ and $Y(k)$ are the spectra of the real sequences $x(n)$ and $y(n)$.

17. (currently amended) Orthogonal frequency division multiplex demodulator ~~(2)~~ according to claim 14 ~~one of the claims 14 to 16~~, wherein the fourth transforming means ~~(15)~~ further comprises:
 - post-processing means ~~(15a)~~ for post-processing of the complex DFT output symbols $Z(k)$, with $k=1\dots N-1$, to the post-processed sub-carrier symbols $F(k) = X(k) + \exp(-j\pi k/N) * Y(k)$ of the intermediate-frequency OFDM signal $(f(n))$;
 - assigning means ~~(15b)~~ for assigning the post-processed sub-carrier symbols $F(k)$ to an order for further processing.
18. (currently amended) Orthogonal frequency division multiplex demodulator ~~(2)~~ according to claim 14 ~~one of the claims 14 to 17~~, wherein the DFT means ~~(14)~~ and the second transforming means ~~(15)~~ are integrated in one device.